

REMARKS

Claims 1-13 and 15-17 are pending in this application. By this Supplemental Amendment, claim 1 is amended. No new matter has been added. Support for the Amendment claim 1 is found, for example, on page 13, line 15 - page 14, line 4 of Applicant's disclosure. Claim 1 is amended to better recite the feature argued in the March 17, 2004 Amendment.

Applicant thanks Examiner Hogans for the courtesies extended to Applicant's undersigned representative during the March 30, 2004 interview. The points discussed are incorporated into the remarks below and constitute the Applicant's record of the interview.

An Information Disclosure Statement was also filed with the March 17, 2004 Amendment. The Examiner is respectfully requested to consider the disclosed information and return to the undersigned an initialed copy of the form PTO 1449 to acknowledge consideration of the disclosed information.

For the reasons stated in the March 17, 2004 Amendment and further stated herein, Applicant respectfully requests reconsideration.

I. Section 112, First Paragraph Rejection

Regarding this rejection, Applicant refers the Examiner's attention to Section I of the March 17, 2004 Amendment.

II. Prior Art Rejections

The December 18, 2003 Office Action rejects claims 1, 4-8, 11 and 15 under 35 U.S.C. §102(b) over JP-A-02-179880 to Koketsu et al. (hereinafter "Koketsu"); claims 1, 4-11 and 15-17 under 35 U.S.C. §102(e) over U.S. Patent No. 6,110,531 to Paz de Araujo (hereinafter "Paz"); claims 2 and 3 under 35 U.S.C. §103(a) over Koketsu in view of U.S. Patent No. 6,146,905 to Chivukula et al. (hereinafter "Chivukula"); and claims 12 and 13

under 35 U.S.C. §103(a) over Koketsu in view of U.S. Patent No. 6,120,846 to Hintermaier (hereinafter "Hintermaier"). The rejections are respectfully traversed.

At the interview, Applicant's representative reviewed the arguments made in the March 17, 2004 filed Amendment and they were discussed in detail. Further, in view of the Amendments to claim 1, it respectfully submitted that none of the applied references disclose a method for manufacturing ceramics on a substrate, comprising increasing the migration energy of atoms in the ceramic film for crystallization of the ceramic film by providing energy to the fine particles of the raw material species by the active species, as recited in claim 1.

Both Koketsu and Paz feature forming a plasma near the substrate.

In particular, Koketsu discloses forming an oxygen plasma and an active species of such oxygen. Koketsu further supplies liquid drops in the form of a mist into the oxygen plasma.

Koketsu is completely silent as to crystallization of the ceramic film, or increasing the migration energy of the atoms in the ceramic film.

Paz discloses a step 620 where a layered superlattice compound, an ABO_3 type metal oxide, or other material 760 is deposited on the substrate 717 by a CVD apparatus. Paz discloses that the film formed in step 620 may be in an amorphous form, in a partially crystallized form, or in a form with a different crystallization than the final form desired (col. 14, lines 27-33 and lines 42-45). Paz discloses further that after formation in step 620, the film 60 is crystallized or recrystallized preferably by a furnace anneal step 622, or alternatively by a RTP step 624 (col. 14, lines 52-59). Paz further discloses that optional ion implantation step 622 may be performed prior to the RTP step 624 or the furnace anneal step 626 to create crystallization sites (col. 15, lines 4-7). Paz's method is detailed in Fig. 11 of Paz.

As disclosed in the above cited passages, Paz discloses a crystallization/recrystallization furnace anneal step after formation of the film 60 and an alternative RTP step. The furnace anneal or the RTP step is done at particular temperatures disclosed in Paz (col. 14, line 52 - col. 15, line 4). The above cited passages of Paz fail to disclose increasing the migration energy of the atoms in the ceramic film for crystallization of the ceramic film by providing energy to the fine particles of the raw material species by the active species, as recited in claim 1. Rather, the energy for the crystallization/recrystallization in Paz comes from heating after film formation.

Paz discloses crystallization/recrystallization by RTP or furnace anneal after formation of the film 60. There is no disclosure in Paz to crystallize or recrystallize by a step other than application of heat to the substrate in the furnace anneal step or an RTP step, which occurs after film formation, not during. There is no disclosure, either explicit, implicit, or inherent of providing energy while the fine particles of raw material species is deposited on the substrate.

Applicants' disclosure discloses that the active species formed in the active species feeding section and fine particles (a mist) formed in the raw material species feeding section or fine particles (a gas) formed in the heating section are mixed in the mixing section in Figure 1. Subsequently, the mixture is fed to the substrate to form a ceramic film. As disclosed in the Applicants' disclosure, the active species and the fine particles of raw material species are mixed, and particles having energy from the active species are fed to the substrate. Therefore, the Applicants' disclosure suggests preventing problems which are likely present in the cited references. The problems, such as possible damage to the plasma-formed ceramic film which is near the substrate, and inconsistent supply of energy to the ceramic film, when a plasma is formed unevenly and kinetic energy of the active species becomes non-uniform, may be addressed. Therefore, in Applicant's invention, even when raw

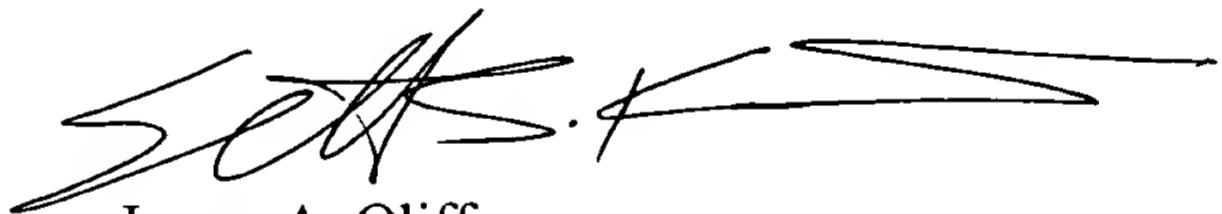
material species are mixed in the plasma, there is no discrepancy between the composition of the raw material species to be obtained and that of the ceramic film.

It is further submitted that none of the remaining references disclose the above recited feature of claim 1. That is, Chivukula, or Hintermaer fails to disclose alone or in combination with Koketsu or Paz, suggest the above recited feature of claim 1. Consequently, claim 1 is patentable over the applied references. Claims 2-13 and 15-17, which depend from claim 1, are likewise patentable over the applied references for at least the reasons discussed above and for the additional features they recite. Withdrawal of the rejection of claims 1-13 and 15-17 are respectfully requested.

III. Conclusion

For the reasons stated in the March 17, 2004 Amendment and further discussed above, Applicant submits that this application is in condition for allowance. Reconsideration of claims 1-13 and 15-17 is respectfully requested.

Respectfully submitted,



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